

distensibility they think it may be of some value. They question the explanation of the transmitted wave advanced by Queirolo, viz., that it is due to the air in the bag being under tension, on the ground that they were unable to get good results when the stomach was previously empty, and hold that the general compression of the bag is the cause of the marked movement, less tension being necessary than if one percussed over a distended stomach communicating with a recorder.

SURGERY.

UNDER THE CHARGE OF

J. WILLIAM WHITE, M.D.,

JOHN RHEA BARTON PROFESSOR OF SURGERY IN THE UNIVERSITY OF PENNSYLVANIA;
SURGEON TO THE UNIVERSITY HOSPITAL,

AND

F. D. PATTERSON, M.D.,

SURGEON TO THE DISPENSARY OF ST. AGNES' HOSPITAL, ASSISTANT SURGEON TO THE DISPENSARY,
UNIVERSITY HOSPITAL.

Spinal Anæsthesia. A Review of the More Recent Literature.—The credit for the discovery of this method of anæsthesia belongs to LEONARD CORNING, of New York, who published the results of his experiments in the *New York Medical Journal*, 1885, vol. xlii., p. 483. He used a solution of cocaine, and his first injection was made between the twelfth dorsal and the first lumbar vertebræ, with complete success. Like MITCHELL (*Injuries of Nerves, and Their Consequences*, Philadelphia, 1872) and THORBURN ("Injuries of the Cauda Equina," *Brain*, vol. x.), he regarded the wounding of the terminal filaments or the nerves of the cauda equina as something to be avoided, and so the injection was made between the membranes and not into the subarachnoid space. Despite Corning's success, this method did not seem to meet with the approval of the profession, for no one else attempted it at this time. Six years later QUINCKE (*Berlin. klin. Wochenschrift*, 1891, No. 38) showed that the cerebro-spinal fluid could be evacuated after lumbar puncture with ease and without danger. His experiments were made in order to decrease the pressure caused by the cerebro-spinal fluid, to obtain some of this fluid for examination and diagnostic purposes in certain conditions, and for the purpose of testing the direct action upon the nerves and cord of certain medicines which could be mixed with this fluid. After that MOSSO and FRANK (*Archives de Physiologie*, 1892, p. 562) showed that the injection of cocaine was followed in six or seven minutes by a complete anæsthesia, which gradually disappeared and was not followed by deleterious effects. SICARD ("Essais d'injections microbiennes, toxiques et thérapeutiques, par voie céphalo rachidienne," *Société de Biologie*, April 30, 1898) injected through a lumbar puncture into the subarachnoid space, in a case of tetanus, 4 c.c. of

antitetanus serum. BIER (*Deutsche Zeitschrift für Chirurgie*, 1899, vol. li., p. 361) applied all of this to surgery in April, 1899, when he made a lumbar puncture, withdrew some of the cerebro-spinal fluid, and then injected a solution of cocaine into the subarachnoid space, and so obtained surgical anæsthesia. He performed six operations in succession by this method, employing a solution varying from 1:100 to 1:200 in strength, first securing anæsthesia of the skin after Schleich's method. The operations were painless, but the persistence of headache and the condition of malaise caused by the injections induced him temporarily to abandon this method. At this time TUFFIER (*La Presse Médicale*, November 15, 1899) began using this method, using a 1 per cent. solution of cocaine, which caused perfect anæsthesia, but was followed by severe headache. About the same time SELDOWITZ (*Centralblatt für Chirurgie*, 1899, No. 41, p. 1110) reported his experience with this method, and since then many names have been added to the bibliography.

CORNING (*Medical Record*, New York, October 20, 1900) thus describes the technique: The needle may be from three and a half to four inches in length and, preferably, made of either platinum or gold, which will bend, but is not liable to break. There should be a small steel nut transfixed by the needle, sliding freely upon it and fixable at any point in the needle's length by the aid of a small set-screw. When the needle is thrust in and a few drops of cerebro-spinal fluid emerge, this nut is slid down until its lower aspect rests on the skin, when it is firmly fixed in place by tightening the screw, and so effectually prevents the further entrance of the needle into the spinal canal. The syringe should be of glass, graduated up to thirty minims or more, and provided with an asbestos packing, which permits of more thorough sterilization. A short, delicate trocar should be used to penetrate the skin of the back, subsequently passing the needle through the opening of the trocar. The operator should prepare his hands as for any major operation, and the patient's back should also be prepared in the usual manner. The syringe, needle, and trocar should be carefully sterilized as well as the anæsthetic, which should be a 2 per cent. solution of the hydrochlorate of cocaine, but SEGUEN and KENDIRDJY (*La Presse Médicale*, October 27, 1900) report having had equally good results with a hydrochlorate of eucaïne solution. At present there seems to be a predilection in favor of making the injection between the spinous processes of the fourth and fifth lumbar vertebrae, although anæsthesia is more quickly induced when the injection is made higher up. After puncturing the skin with a trocar the needle should be slowly introduced through the trocar in a direction from without inward and from below upward. The outflow of a few drops of cerebro-spinal fluid will tell of the penetration of the membranes. The needle may now be attached and injection made of from 10 to 15 minims of a 2 per cent. cocaine solution. The needle should be maintained in place until anæsthesia appears. The phenomena following the injections are paræsthesia, tingling, numbness, and finally disappearance of sensibility to pain in the regions below the point of injection. The time that elapses before anæsthesia is complete is variable, but, as a rule, it is from four to ten minutes, and the duration of the anæsthesia is from an hour to an hour and a half. This method of anæsthesia has been used in a large number of cases, and so

far without a single death due to the anæsthetic. Seguen and Kendirdjy (*supra cit.*) report their results in fifty-seven cases, in all but two of which the anæsthesia was perfect. The first of the two unsuccessful cases was a woman with appendicitis, and the second was a case of bilateral salpingitis, necessitating vaginal hysterectomy. In three other cases vaginal hysterectomy was performed under perfect anæsthesia. TUFFIER (*La Presse Médicale*, November 7, 1900) reports 210 successful cases, 112 of which were intraperitoneal operations. Many others have added to the bibliography of this method; thus KREIS (*Centralblatt für Gynakologie*, July, 1900), DOLERIS ("Anesthésie Obstetricale par injection de cocaïne sous l'arachnoïde lombaire," *Académie de Médecine*, July 17, 1900), and MARX (*New York Medical News*, August 25, 1900) have applied this method to obstetrics. TUFFIER ("De l'anesthésie médullaire par injection de cocaïne sous l'arachnoïde lombaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900) gives a most thorough review of his experience to date. SEVEREAUN and GEROTA ("L'analgésie chirurgicale par les injections de cocaïne dans le canal rachidien," *XIII. Congrès Internat. de Médecine*, Paris, 1900), NICOLETTI ("Recherches expérimentales, histo-pathologiques et cliniques sur l'anesthésie cocaïnique de la moelle épinière par injection sous arachnoïdienne lombaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900), PRITESCI ("Anesthesia par injection de cocaïne dans le canal médullaire," *XIII. Congrès Internat. de Médecine*, Paris, 1900), and RACORICEANU (*Contribution à l'Étude de l'Anesthésie Médullaire par la Cocaïne*, Paris, 1900) report cases, and state their belief that the nerves return to the normal and remain so after the injections. BIER (*Münchener med. Wochenschrift*, September 4, 1900), after an experimental and clinical study, insists, with reason, upon the dangers of using large doses of the anæsthetic. More recently POUSSEON and CHAVAUNAZ (*Journal de Méd. de Bordeaux*, 1900, vol. xxx.), JONNESCO (*Bull. et Mem. de la Soc. de Chir. de Bucarest*, 1900, vol. ii.), DUMONT (*Correspondenzblatt f. Schweizer Aertze*, 1900, No. 13), BIBOT (*Un Nouveau Procédé d'Anesthésie Chirurgicale*, Paris, 1900), DE RONVILLE (*Nouveau Montpellier Médicale*, 1900), TUFFIER and HALLION (*Société de Biologie*, November 4, 1900), MOORE and STEWART (*Northwestern Lancet*, November 1, 1900), and TAYLOR (*Virginia Medical Semi-Monthly*, October 26, 1900) have reported cases. As a rule, the phenomena following the subarachnoid injection of cocaine are vomiting, headache, and some elevation of temperature. SEGUEN and KENDIRDJY (*supra cit.*) state that in 31 of their 55 cases vomiting was entirely absent. Thirteen of the patients did not vomit during the operation, but did so in from a few minutes to an hour after the completion of the operation. In 11 cases the vomiting came on during the operation, but ceased before it was finished, and did not recur afterward. Headache was a little more frequent, being present in 31 cases. As a rule, it was not severe and lasted until the following morning, and probably helped to produce the insomnia, which often follows this method of anæsthesia. However, in two cases it was very acute, and in another case (that of a woman who had been curetted) it presented the characteristics of a true morcellement during the following thirty-six hours. An elevation of temperature was observed after the operation in 12 of the 55 cases; in one case (that of an abscess following extravasation of urine) it could not be attributable to the injection, but was the result of the patient's

condition. The other cases comprised: 6 radical cures for inguinal hernia, 2 cases of tubercular epididymitis, 1 case of varicocele, 1 case of fistula in ano, and 2 cases of curettement. The temperature in these cases varied between 38° and 40° C., and by the following morning it came down to normal, and remained there. The night after the operation is often a restless one, often the result of the elevation of temperature and the headache, for when both of these sequelæ were absent the patients slept well. Dilatation of the pupil was observed in a certain number of cases, generally as a phenomenon premonitory of vomiting and headache, and was the result of a more rapid or greater action of the cocaine. In seven cases relaxation of the sphincter ani was observed; in one case it occurred during the operation. Paraplegia has been feared by some authors as a sequela, but in only one case was it observed—that of a woman who was curetted and who had slight paralysis of the legs for three hours, when it disappeared. Some vesical troubles have followed this method of anæsthesia. One case operated on for hydrocele had retention of urine for eight days, and the symptom then disappeared. In another case, that of a woman who was curetted for metritis, incontinence suddenly developed without being preceded by retention, and lasted for three days.

SEGUEN and KENDIRDJY (*loc. cit.*) state that this method of producing anæsthesia has its advantages and its disadvantages. Among the former are that it may be used in those patients who are afraid to take chloroform and who desire to be operated upon without suffering and without loss of consciousness; but it is also to be remembered that for certain operations this may be a great inconvenience, such as in the major pelvic and abdominal operations, in which this method of anæsthesia is distinctly contraindicated. It is especially contraindicated in the major gynecological operations, for with this method muscular relaxation cannot be obtained; vomiting may come on during the operation, and these distinctly increase the operative risk in a delicate operation. But aside from these restrictions the lumbar anæsthesia is superior to the general anæsthesia; during the operation the anæsthesia is absolute; after the operation the patient is returned to his bed in a calm frame of mind. He may eat before and after the operation, and there is not the sequela of almost constant vomiting which nearly always follows the use of a general anæsthetic. Again, nothing is more in favor of the use of the lumbar anæsthesia than the rapidity with which it is agreed to; and the patient is returned to his room conscious and tranquil. Patients who have submitted to general anæsthesia and also to the lumbar method cannot speak too highly of the latter. On the other hand, spinal anæsthesia is not destined to replace chloroform, but it does constitute an excellent method for a certain class of cases. General anæsthesia is still indicated in the major gynecological and pelvic operation, preferably in vaginal hysterectomy, in exploratory laparotomies, and in all operations in which muscular relaxation is essential to operative success; but, on the contrary, the spinal anæsthesia is to be preferred in all operations below the umbilicus which are short in duration and simple of execution, such as operations on the perineum, the external genitalia, and the legs in cases where muscular relaxation is not a factor in operative success. In conclusion, it may be said that although no deaths have so far been reported from this method, it still remains to be shown that subarachnoid cocainization is safer than general

anæsthesia; in fact, it is very questionable if it is as safe. The puncture of the spinal canal itself, not to mention the injection of cocaine, is not without its danger, as has been shown by GUMPRECHT (*Deutsche med. Wochenschrift*, 1900, vol. xxvi., p. 386), who reports seventeen cases of sudden death following simple lumbar puncture for diagnostic purposes. Beside this the involuntary defecation and urination during the operation is not only embarrassing, but in addition may add greatly to the operative risk by infecting the field of operation. Again, it would seem to be a marked disadvantage instead of an advantage to have the patient conscious during the operation.

As Corning (*supra cit.*) has stated, everyone at all conversant with the serious results inevitably following infection of a serous cavity must be profoundly impressed with the necessity of a rigid asepsis, and any neglect of those necessary and elaborate rules of antisepsis so necessary to the safety of the patient will be followed by most disastrous results. He clearly emphasizes the dangers to the cord from this operation, and it would seem that sufficient time has not yet elapsed to prove absolutely that this method of anæsthesia will not be followed by degeneration of the cord and of the nerves.

Observations on the Surgery of the Gall Tracts.—JONES (*Medical Record*, October 20, 1900) states that patients with long-standing disease of the gall tracts are poor subjects for surgical operation, and surgical interference is attended by considerable risk. In such cases it would seem to be best to do first a cholecystostomy—the simplest operation and the one attended by the least risk—leaving more radical treatment for another time should it become necessary. He emphasizes: (1) The diagnostic value of the point of maximum tenderness on pressure, which is over the gall-bladder, at or near the costal margin of the ninth rib. This point in disease of the gall tracts corresponds in importance with McBurney's point in disease of the appendix. (2) The diagnostic value of the presence of bile in the urine excreted during or immediately after a very brief obstruction of the common duct. (3) That disease of the gall tracts is of very common occurrence, and is liable to be mistaken for other troubles which it closely imitates, so it is important that the cases be recognized early.

Clinical Notes on Cases of Gallstones.—CHAPMAN (*Intercolonial Medical Journal of Australasia*, September 20, 1900) reports three cases. The first case was a woman who presented symptoms of pain in the region between the ensiform cartilage and the umbilicus, vomiting after severe attacks of pain and on taking solid food, some jaundice, and some fever. A small, rounded, movable tumor could be felt above the umbilicus just to the right of the median line. Palpation of this tumor caused severe pain. An exploratory operation was performed, and on exposing the tumor it was found to be the gall-bladder, slightly enlarged and containing a stone, which was removed. The gall-bladder was sutured to the peritoneum and drained. The patient made an uninterrupted recovery. The second case was that of a woman who complained of indigestion, occasional attacks of vomiting, jaundice, loss of appetite, and pain on the right side in the epigastric region,